ACTIVITY 18

AIR POLLUTION ALLOWANCE TRADING

This exercise introduces students to pollution abatement measures based on free market trading of pollution allowances. The class is broken up into six groups, each representing an industry subject to a fictitious Air Pollution Allowance Trading System. They are given a set of facts and conditions and will be required to make a series of decisions in order to comply with environmental regulations, as well as determine the price of a pollution allowance, and whether to implement pollution control measures. This activity is related to the "Making Decisions" warm-up and the "Cost of Polluting" activity.

CRITICAL OBJECTIVES

- Recognize the costs of pollution abatement
- Recognize how costs are allocated and can be shared
- Decide how to allocate scarce resources
- Recognize the benefits of the free market in pollution abatement (rewarding good behavior)
- Learn to analyze environmental issues

SKILLS

- Computing
- Analyzing data
- Drawing conclusions
- Explaining results

BACKGROUND

There are several different types of pollution control measures that the government imposes on polluters to achieve compliance with environmental regulations. "Point source" controls impose standards on the emissions coming out of a facility (such as a factory) without regard to the cost of achieving the standard or the mixture of that discharge with other point source discharges in the local environment. Another method concentrates on the level of pollution in the local area (such as a river segment or air within a city's boundaries), requiring some sort of pollution reduction measures when the area is out of compliance. This latter method is used under the Clean Air Act, but has been difficult to enforce given the large number of individual air pollution sources that exist (for example, automobiles).

Under an allowance trading system, large stationary sources of air pollution, such as power plants, receive a certain number of "pollution allowances" for a specified period of time, based on local clean

RELATED WARM-UP
G

REFER TO READING MATERIALS
"Air Pollution Allowance Trading"

TARGET GRADE LEVEL
7th - 12th

DURATION
45 minutes

VOCABULARY
Allowance
Bank
Compliance
Discharge
Point source

MATERIALS
Scratch paper
Calculators (optional)

WORKSHEETS INCLUDED
6

air standards and allocated to the sources according to their historic fuel consumption and a specified emissions rate for the source. Allowances are in units of pollutant emitted, so a polluter will use up its allowances as it pollutes. The key to the system is that these allowances may be traded between sources, or may be "banked." At the end of the period, each source must have enough allowances to balance its emissions for that period, otherwise a penalty on each excess unit of pollution is imposed. The goal of this system is to use market incentives of rewards and penalties to reduce pollution, allowing polluters to make their own decisions as to how to expend their allocation of pollution allowances.

EXAMPLE

An electric utility, Metropolis Power and Light (MP&L) wants to install a certain pollution reduction technology at one of its electricity generation plants that will cost $100,000. Without an allowance system, MP&L may not be rewarded for doing the right thing, and has no other incentive to do so. However, under an allowance trading system, MP&L would save four allowances if it installs the clean air equipment and reduces its emissions of pollution. MP&L can sell the allowances in the pollution allowance market and recover part or all of the money it spent on the equipment, or even receive compensation above the amount spent.

Another utility, Commonwealth Gas and Electric (CG&E) does not implement any pollution reduction measures. During the year, CG&E has used up all of its allowances and is going to pay $250,000 in fines for pollution in excess of its allowances. CG&E estimates that it is 4 allowances short for the period and is willing to pay MP&L up to $250,000 for four allowances. Hence, MP&L, by implementing pollution reduction measures at a cost of $100,00, is rewarded the difference between that cost and the market value of the allowances it saves (in this example, $250,000 - $100,000 = $150,000 to MP&L).

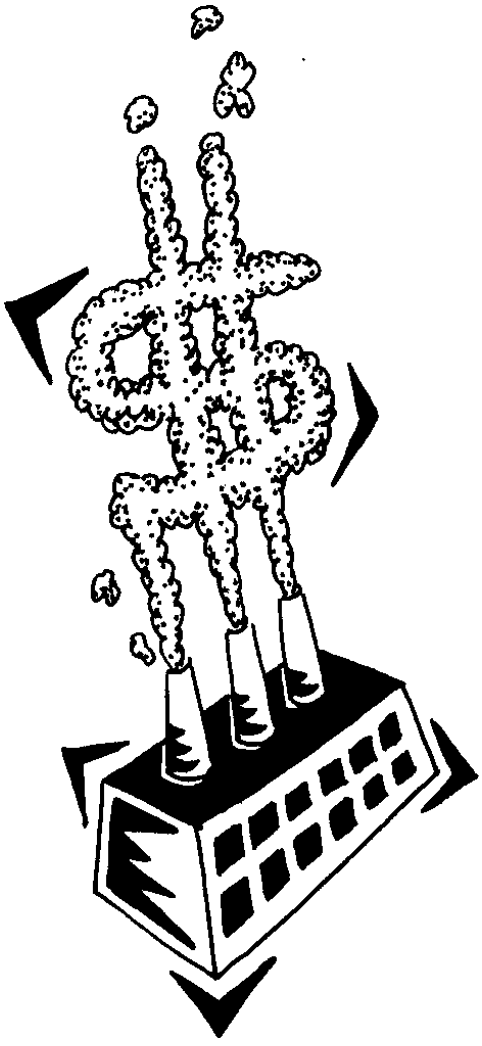
WHAT TO DO

1. Discuss the material presented in the above background section. Discuss the different ways that air pollution laws are enforced, and the different methods that may be used to reduce pollution. Explain how the pollution allowance system can reduce pollution by using incentives and market forces to encourage pollution reduction. Present the above example on the blackboard.

2. Break the class up into six groups and distribute facts and conditions. Each group receives the one page sheet entitled "Pollution Allowance Trading Game." Each individual group also receives the appropriate "scor-

ing" sheet, labeled "Group 1," "Group 2," and so on. Briefly explain the concepts and rules of the game, reading the fact sheets along with the students. The goal of the game is to make the most money through the trading and saving of pollution allowances. Have students read the fact sheets and answer any questions. Tell them that the game will be played for five rounds. A round represents one year. Each year they will receive a number of allowances that may increase or decrease, but they do not know what those changes will be.

3. Have the groups complete questions 1 through 3 on each worksheet. After completing questions 1 through 3, each group will have to make three decisions: whether to sell or buy allowances; whether to pay for pollution abatement technology; and whether to bank allowances or pay fines. Remind the groups that pollution abatement technology is permanent, and will carry over year to year. Tally the number of allowances that are available from all groups. Have any groups complete question 4, and re-tally the number of extra allowances available. Then commence the trading of allowances through the auctioning of allowances (the teacher or a student may act as auctioneer). Have groups answer remaining questions. If allowances are bought and sold, how much does an allowance cost? Why?



4. For the second round, each group will again receive ten allowances. Repeat the steps from the previous round, making sure that they carry over any banked allowances and taking into account units of technology purchased. Has the price of an allowance changed? Why?

5. For the third round, each group receives only 8 allowances. Do not let students know that this change is coming. Repeat steps on worksheets. Record changes in allowance prices, technology purchasing patterns, fines paid out, and allowance banking.

6. For the fourth round (Year 4) distribute 11 allowances per group. Record changes as above.

7. Year 5 is back to 10 allowances per group. Record changes and determine the winner based on the value of the allowances in hand minus any fines paid. Have students discuss the results. Who did the best? Why? At the beginning of the game, Group 5 was in the best position. Did they maintain their lead? How did Group 4 fare? Why? Compare Groups 1 and 2, who began on even footing. Did one do better than the other? Why?

8. Have students discuss the usefulness of an allowance trading system, in particular the incentive to reduce emissions through the use of pollution reduction technology. Note that the number of allowances distributed for the first round was less than the total amount of emissions? Ask students how and why they think fines would be built into the game from the outset.

SUGGESTED EXTENSIONS (OPTIONAL)

- Teachers should feel free to alter the facts. For example, the price of pollution abatement technology may change from year to year, or fines may change. The results need only reflect the current conditions and prices, and some results may be "unreasonable."

SUGGESTED MODIFICATIONS

- For higher grades, have students consider alternatives to this system and consider the choices they would face and make if they were the regulator. Focus a class discussion on the topic or have students prepare and deliver oral presentations about their ideas.

SUGGESTED READING

Kohn, Robert E. "Exposure Trading: An Approach to More Efficient Air Pollution Control." *Journal of Environmental Economics and Management*, 21 (July 1991) p. 82.

Mann, Eric. "Trading Delusions." *Environmental Action Magazine*, 25 (December 1994) p. 22.

Miller, William H. "Free Market Comes to Environmentalism." *Industry Week*, 242 (19 April 1993) p. 59.

"Pollution for Sale." *U.S. News and World Report*, 111 (29 July 1991) p. 9.

"Pollution Swap May Halve Utility Emissions." *National Geographic*, 184 (December 1993) p. 142.

Sheridan, John H. "Pollution Prevention Picks Up Steam." *Industry Week*, 241 (17 February 1992) p. 36.

STUDENT HANDOUT 1
AIR POLLUTION ALLOWANCE TRADING
AIR POLLUTION ALLOWANCE TRADING GAME

For this exercise, each group has been given a role and an individual set of facts outlining the rules and circumstances going into the pollution allowance trading game. Each group represents a public utility that emits air pollution, however, the amount each can emit is limited by the government. A group will be penalized for exceeding air pollution limits. For each round of the game, each group will receive a certain number of air pollution allowances that represent a portion of the amount of pollution they are allowed to emit. If a group does not use up all of its allowances, it can trade or bank remaining allowances. For example, if a group receives 5 allowances, and each allowance permits 1,000 tons of pollution, then the group's factory can emit 5,000 tons of pollution. Any excess would be subject to a fine. If the group emits 3,000 tons, then it will only use up 3 of its allowances, and may then sell or bank the other 2. If the group emits 7,000 tons of pollution, it will be penalized unless it purchases extra allowances or has banked allowances.

There will be five rounds of trading. Each round represents one year. At the beginning of each round, each group will receive an allocation of allowances. For each round, the number of allowances received will be the same for each group, however, the number of allowances may increase or decrease from round to round. Extra allowances banked during one round may be used during subsequent rounds.

In addition to deciding whether to buy, sell, or bank allowances, a group may also decide to purchase pollution reduction technology. Technology units cost $2,000. Each unit provides 500 tons of annual pollution reduction. Technology units reduce pollution beginning in the year they are purchased and will continue to provide pollution reduction in subsequent rounds. In no event can a group emit less than 5,000 tons per year.

An allowance permits the emission of 1,000 tons of air pollution. The penalty for exceeding the allowance limit is $1 per ton per year.

TO RECAP:
5 rounds of trading.
Allowances are distributed at the beginning of each round.
An allowance permits 1,000 tons of pollution.
Extra allowances may be bought and sold, or banked (saved for use in future rounds).
Penalties = $1 per ton in excess of allowances.
Pollution reduction technology costs $2,000 per unit.
Technology reduces pollution by 500 tons per round.
Technology is permanent.
A group can not emit less than 5,000 tons per round

STUDENT WORKSHEET 1
AIR POLLUTION ALLOWANCE TRADING
AIR POLLUTION ALLOWANCE TRADING GAME

GROUP 1

You are a coal-burning electric power utility with a single power plant. You have received 10 pollution allowances for the first year. The number of allowances you will receive in future rounds is unknown. Based on your current projections, you will emit 10,000 tons of pollution annually in the coming 5 years.

1. Calculate your pollution emission allowance for the year.
   Year 1: _____ Year 2: _____ Year 3: _____ Year 4: _____ Year 5: _____

2. Do you have any extra allowances for the year (is your annual pollution emission less than your total allowances in hand)?
   a) NO, skip to question 3
   b) YES, how many (you can skip question 3)?
   Year 1: _____ Year 2: _____ Year 3: _____ Year 4: _____ Year 5: _____

3. Did you exceed your allowances (is your annual pollution emission greater than your total allowances in hand)?
   a) YES, how many extra allowances do you need?
   Year 1: _____ Year 2: _____ Year 3: _____ Year 4: _____ Year 5: _____

   b) Calculate any penalties you will pay if you are not able to purchase extra allowances.
   Year 1: _____ Year 2: _____ Year 3: _____ Year 4: _____ Year 5: _____

   c) How much would you be willing to pay for an allowance? Divide the penalty amount by the number of allowances you need.
   Year 1: _____ Year 2: _____ Year 3: _____ Year 4: _____ Year 5: _____

The auctioneer (your teacher) will now tally the number of allowances available.

4. Before trading begins, would you like to purchase pollution reduction technology? If yes, how many units?
   Year 1: _____ Year 2: _____ Year 3: _____ Year 4: _____ Year 5: _____

   Recalculate your annual pollution emissions.
   Year 1: _____ Year 2: _____ Year 3: _____ Year 4: _____ Year 5: _____

The auctioneer will now re-tally the number of allowances available. Now begin trading. Some groups have extra allowances that they may wish to sell, while others will be paying fines if they do not acquire extra allowances. Note that groups with extra allowances do not have to sell them if the selling price is not high enough. They can bank them for use or sale in later rounds.

5. How did your group end up at the end of the year (+/-)? (include money received for extra allowances sold, money paid in penalties or for extra allowances needed, money paid for pollution reduction technology, and the number of allowances banked)

Year 1: _____ Year 2: _____ Year 3: _____ Year 4: _____ Year 5: _____

6. What is the current price of an allowance?
Year 1: _____ Year 2: _____ Year 3: _____ Year 4: _____ Year 5: _____

Now go on to the next round. Your teacher will tell you the number of allowances each group will receive. Remember that this number may go up or down. For each round, fill in the above work sheet, recording the results of each round of trading. Be sure to keep track of your current account: the amount (+ or -) that your group has had earned or spent.

STUDENT WORKSHEET 2
AIR POLLUTION ALLOWANCE TRADING
AIR POLLUTION ALLOWANCE TRADING GAME

GROUP 2

You are a coal-burning electric power utility with a single power plant. You have received 10 pollution allowances for the first year. The number of allowances you will receive in future rounds is unknown. Based on your current projections, you will emit 10,000 tons of pollution annually in the coming 5 years.

1. Calculate your pollution emission allowance for the year.
   Year 1: _____ Year 2: _____ Year 3: _____ Year 4: _____ Year 5: _____

2. Do you have any extra allowances for the year (is your annual pollution emission less than your total allowances in hand)?
   a) NO, skip to question 3
   b) YES, how many (you can skip question 3)?
   Year 1: _____ Year 2: _____ Year 3: _____ Year 4: _____ Year 5: _____

3. Did you exceed your allowances (is your annual pollution emission greater than your total allowances in hand)?
   a) YES, how many extra allowances do you need?
   Year 1: _____ Year 2: _____ Year 3: _____ Year 4: _____ Year 5: _____

   b) Calculate any penalties you will pay if you are not able to purchase extra allowances.
   Year 1: _____ Year 2: _____ Year 3: _____ Year 4: _____ Year 5: _____

   c) How much would you be willing to pay for an allowance? Divide the penalty amount by the number of allowances you need.
   Year 1: _____ Year 2: _____ Year 3: _____ Year 4: _____ Year 5: _____

The auctioneer (your teacher) will now tally the number of allowances available.

4. Before trading begins, would you like to purchase pollution reduction technology?
   If yes, how many units?
   Year 1: _____ Year 2: _____ Year 3: _____ Year 4: _____ Year 5: _____

   Recalculate your annual pollution emissions.
   Year 1: _____ Year 2: _____ Year 3: _____ Year 4: _____ Year 5: _____

The auctioneer will now re-tally the number of allowances available. Now begin trading. Some groups have extra allowances that they may wish to sell, while others will be paying fines if they do not acquire extra allowances. Note that groups with extra allowances do not have to sell them if the selling price is not high enough. They can bank them for use or sale in later rounds.

5. How did your group end up at the end of the year (+/-)? (include money received for extra allowances sold, money paid in penalties or for extra allowances needed, money paid for pollution reduction technology, and the number of allowances banked)
   Year 1: _____ Year 2: _____ Year 3: _____ Year 4: _____ Year 5: _____

6. What is the current price of an allowance?
   Year 1: _____ Year 2: _____ Year 3: _____ Year 4: _____ Year 5: _____

Now go on to the next round. Your teacher will tell you the number of allowances each group will receive. Remember that this number may go up or down. For each round, fill in the above work sheet, recording the results of each round of trading. Be sure to keep track of your current account: the amount (+ or -) that your group has had earned or spent.

STUDENT WORKSHEET 3
AIR POLLUTION ALLOWANCE TRADING
AIR POLLUTION ALLOWANCE TRADING GAME

GROUP 3

You are a coal-burning electric power utility with a single power plant. You have received 10 pollution allowances for the first year. The number of allowances you will receive in future rounds is unknown. Based on your current projections, you will emit 9,000 tons of pollution annually in the coming 5 years.

1. Calculate your pollution emission allowance for the year.
   Year 1: _____ Year 2: _____ Year 3: _____ Year 4: _____ Year 5: _____

2. Do you have any extra allowances for the year (is your annual pollution emission less than your total allowances in hand)?
   a) NO, skip to question 3
   b) YES, how many (you can skip question 3)?
   Year 1: _____ Year 2: _____ Year 3: _____ Year 4: _____ Year 5: _____

3. Did you exceed your allowances (is your annual pollution emission greater than your total allowances in hand)?
   a) YES, how many extra allowances do you need?
   Year 1: _____ Year 2: _____ Year 3: _____ Year 4: _____ Year 5: _____

   b) Calculate any penalties you will pay if you are not able to purchase extra allowances.
   Year 1: _____ Year 2: _____ Year 3: _____ Year 4: _____ Year 5: _____

   c) How much would you be willing to pay for an allowance? Divide the penalty amount by the number of allowances you need.
   Year 1: _____ Year 2: _____ Year 3: _____ Year 4: _____ Year 5: _____

The auctioneer (your teacher) will now tally the number of allowances available.

4. Before trading begins, would you like to purchase pollution reduction technology?
   If yes, how many units?
   Year 1: _____ Year 2: _____ Year 3: _____ Year 4: _____ Year 5: _____

   Recalculate your annual pollution emissions.
   Year 1: _____ Year 2: _____ Year 3: _____ Year 4: _____ Year 5: _____

The auctioneer will now re-tally the number of allowances available. Now begin trading. Some groups have extra allowances that they may wish to sell, while others will be paying fines if they do not acquire extra allowances. Note that groups with extra allowances do not have to sell them if the selling price is not high enough. They can bank them for use or sale in later rounds.

5. How did your group end up at the end of the year (+/-)? (include money received for extra allowances sold, money paid in penalties or for extra allowances needed, money paid for pollution reduction technology, and the number of allowances banked)

   Year 1: _____ Year 2: _____ Year 3: _____ Year 4: _____ Year 5: _____

6. What is the current price of an allowance?
   Year 1: _____ Year 2: _____ Year 3: _____ Year 4: _____ Year 5: _____

Now go on to the next round. Your teacher will tell you the number of allowances each group will receive. Remember that this number may go up or down. For each round, fill in the above work sheet, recording the results of each round of trading. Be sure to keep track of your current account: the amount (+ or -) that your group has had earned or spent.

STUDENT WORKSHEET 4
AIR POLLUTION ALLOWANCE TRADING
AIR POLLUTION ALLOWANCE TRADING GAME

GROUP 4

You are a coal-burning electric power utility with a single power plant. You have received 10 pollution allowances for the first year. The number of allowances you will receive in future rounds is unknown. Based on your current projections, you will emit 16,000 tons of pollution annually in the coming 5 years.

1. Calculate your pollution emission allowance for the year.
   Year 1: _____ Year 2: _____ Year 3: _____ Year 4: _____ Year 5: _____

2. Do you have any extra allowances for the year (is your annual pollution emission less than your total allowances in hand)?
   a) NO, skip to question 3
   b) YES, how many (you can skip question 3)?
   Year 1: _____ Year 2: _____ Year 3: _____ Year 4: _____ Year 5: _____

3. Did you exceed your allowances (is your annual pollution emission greater than your total allowances in hand)?

a) YES, how many extra allowances do you need?
   Year 1: _____ Year 2: _____ Year 3: _____ Year 4: _____ Year 5: _____

b) Calculate any penalties you will pay if you are not able to purchase extra allowances.
   Year 1: _____ Year 2: _____ Year 3: _____ Year 4: _____ Year 5: _____

c) How much would you be willing to pay for an allowance? Divide the penalty amount by the number of allowances you need.
   Year 1: _____ Year 2: _____ Year 3: _____ Year 4: _____ Year 5: _____

The auctioneer (your teacher) will now tally the number of allowances available.

4. Before trading begins, would you like to purchase pollution reduction technology?
   If yes, how many units?
   Year 1: _____ Year 2: _____ Year 3: _____ Year 4: _____ Year 5: _____

   Recalculate your annual pollution emissions.
   Year 1: _____ Year 2: _____ Year 3: _____ Year 4: _____ Year 5: _____

The auctioneer will now re-tally the number of allowances available. Now begin trading. Some groups have extra allowances that they may wish to sell, while others will be paying fines if they do not acquire extra allowances. Note that groups with extra allowances do not have to sell them if the selling price is not high enough. They can bank them for use or sale in later rounds.

5. How did your group end up at the end of the year (+/-)? (include money received for extra allowances sold, money paid in penalties or for extra allowances needed, money paid for pollution reduction technology, and the number of allowances banked)

Year 1: _____ Year 2: _____ Year 3: _____ Year 4: _____ Year 5: _____

6. What is the current price of an allowance?
Year 1: _____ Year 2: _____ Year 3: _____ Year 4: _____ Year 5: _____

Now go on to the next round. Your teacher will tell you the number of allowances each group will receive. Remember that this number may go up or down. For each round, fill in the above work sheet, recording the results of each round of trading. Be sure to keep track of your current account: the amount (+ or -) that your group has had earned or spent.

STUDENT WORKSHEET 5
AIR POLLUTION ALLOWANCE TRADING
AIR POLLUTION ALLOWANCE TRADING GAME

GROUP 5

You are a coal-burning electric power utility with a single power plant. You have received 10 pollution allowances for the first year. The number of allowances you will receive in future rounds is unknown. Based on your current projections, you will emit 7,000 tons of pollution annually in the coming 5 years.

1. Calculate your pollution emission allowance for the year.
   Year 1: _____ Year 2: _____ Year 3: _____ Year 4: _____ Year 5: _____

2. Do you have any extra allowances for the year (is your annual pollution emission less than your total allowances in hand)?
   a) NO, skip to question 3
   b) YES, how many (you can skip question 3)?
   Year 1: _____ Year 2: _____ Year 3: _____ Year 4: _____ Year 5: _____

3. Did you exceed your allowances (is your annual pollution emission greater than your total allowances in hand)?
   a) YES, how many extra allowances do you need?
   Year 1: _____ Year 2: _____ Year 3: _____ Year 4: _____ Year 5: _____

   b) Calculate any penalties you will pay if you are not able to purchase extra allowances.
   Year 1: _____ Year 2: _____ Year 3: _____ Year 4: _____ Year 5: _____

   c) How much would you be willing to pay for an allowance? Divide the penalty amount by the number of allowances you need.
   Year 1: _____ Year 2: _____ Year 3: _____ Year 4: _____ Year 5: _____

The auctioneer (your teacher) will now tally the number of allowances available.

4. Before trading begins, would you like to purchase pollution reduction technology?
   If yes, how many units?
   Year 1: _____ Year 2: _____ Year 3: _____ Year 4: _____ Year 5: _____

   Recalculate your annual pollution emissions.
   Year 1: _____ Year 2: _____ Year 3: _____ Year 4: _____ Year 5: _____

The auctioneer will now re-tally the number of allowances available. Now begin trading. Some groups have extra allowances that they may wish to sell, while others will be paying fines if they do not acquire extra allowances. Note that groups with extra allowances do not have to sell them if the selling price is not high enough. They can bank them for use or sale in later rounds.

5. How did your group end up at the end of the year (+/-)? (include money received for extra allowances sold, money paid in penalties or for extra allowances needed, money paid for pollution reduction technology, and the number of allowances banked)

   Year 1: _____ Year 2: _____ Year 3: _____ Year 4: _____ Year 5: _____

6. What is the current price of an allowance?
   Year 1: _____ Year 2: _____ Year 3: _____ Year 4: _____ Year 5: _____

Now go on to the next round. Your teacher will tell you the number of allowances each group will receive. Remember that this number may go up or down. For each round, fill in the above work sheet, recording the results of each round of trading. Be sure to keep track of your current account: the amount (+ or -) that your group has had earned or spent.

STUDENT WORKSHEET 6
AIR POLLUTION ALLOWANCE TRADING
AIR POLLUTION ALLOWANCE TRADING GAME

GROUP 6

You are a coal-burning electric power utility with a single power plant. You have received 10 pollution allowances for the first year. The number of allowances you will receive in future rounds is unknown. Based on your current projections, you will emit 12,000 tons of pollution annually in the coming 5 years.

1. Calculate your pollution emission allowance for the year.
   Year 1: _____ Year 2: _____ Year 3: _____ Year 4: _____ Year 5: _____

2. Do you have any extra allowances for the year (is your annual pollution emission less than your total allowances in hand)?
   a) NO, skip to question 3
   b) YES, how many (you can skip question 3)?
   Year 1: _____ Year 2: _____ Year 3: _____ Year 4: _____ Year 5: _____

3. Did you exceed your allowances (is your annual pollution emission greater than your total allowances in hand)?
   a) YES, how many extra allowances do you need?
   Year 1: _____ Year 2: _____ Year 3: _____ Year 4: _____ Year 5: _____

   b) Calculate any penalties you will pay if you are not able to purchase extra allowances.
   Year 1: _____ Year 2: _____ Year 3: _____ Year 4: _____ Year 5: _____

   c) How much would you be willing to pay for an allowance? Divide the penalty amount by the number of allowances you need.
   Year 1: _____ Year 2: _____ Year 3: _____ Year 4: _____ Year 5: _____

The auctioneer (your teacher) will now tally the number of allowances available.

4. Before trading begins, would you like to purchase pollution reduction technology? If yes, how many units?
   Year 1: _____ Year 2: _____ Year 3: _____ Year 4: _____ Year 5: _____

   Recalculate your annual pollution emissions.
   Year 1: _____ Year 2: _____ Year 3: _____ Year 4: _____ Year 5: _____

The auctioneer will now re-tally the number of allowances available. Now begin trading. Some groups have extra allowances that they may wish to sell, while others will be paying fines if they do not acquire extra allowances. Note that groups with extra allowances do not have to sell them if the selling price is not high enough. They can bank them for use or sale in later rounds.

5. How did your group end up at the end of the year (+/-)? (include money received for extra allowances sold, money paid in penalties or for extra allowances needed, money paid for pollution reduction technology, and the number of allowances banked)

   Year 1: _____ Year 2: _____ Year 3: _____ Year 4: _____ Year 5: _____

6. What is the current price of an allowance?
   Year 1: _____ Year 2: _____ Year 3: _____ Year 4: _____ Year 5: _____

Now go on to the next round. Your teacher will tell you the number of allowances each group will receive. Remember that this number may go up or down. For each round, fill in the above work sheet, recording the results of each round of trading. Be sure to keep track of your current account: the amount (+ or -) that your group has had earned or spent.